Sun Signals

Use observations to forecast space weather on Earth.

E.6.8.7 "Analyze and interpret data from the surface features of the Sun (e.g., photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline Sun observations that could affect Earth, then circle the Earth effects in the passage and table. Number each underlined observation and its matching effect with the same number.

Reading the Sun's Signals

1. A space-weather team watches the Sun because changes there can reach Earth. The photosphere is the bright layer we usually see. Dark sunspots on it are cooler than nearby areas. Scientists count sunspots because clusters often appear when the Sun is more active. A count alone cannot tell whether Earth will be affected.

2. Above the photosphere, the corona is a thin, hot outer atmosphere. A prominence is a huge loop of glowing gas. Sometimes a prominence erupts, sending charged particles into space. A solar flare is a sudden burst of energy. A flare can disturb some radio signals soon after it happens.

3. Look at the team's made-up observation log below. Each Earth report followed the Sun report in the same row. Charged particles from an eruption may take a day or more to reach Earth and brighten auroras near the poles. If a burst misses Earth, its effects may be small. Use patterns as clues, not promises.

SPACE-WEATHER OBSERVATION LOG

Day	Sun report	Earth report over the next two days
1	2 sunspots; no flare or eruption	No unusual radio trouble or auroras
2	18 sunspots; strong flare; prominence erupts toward Earth	Radio fades soon; bright auroras two days later
3	16 sunspots; strong flare; eruption heads away from Earth	Radio fades soon; no unusual auroras reported
4	20 sunspots; no flare or eruption	No unusual radio trouble or auroras

2 ANSWER WITH EVIDENCE

Use the passage

1. Days 2 and 3 both had strong flares. Which Earth effect was the same, which was different, and what Sun observation helps explain the difference?

2. Day 4 had more sunspots than day 2. Why would sunspot count alone have been a poor way to predict day 4's Earth report?

3. On day 2, why did radio signals fade sooner than bright auroras appeared?

4. Suppose a new Sun report shows 16 sunspots but no flare, and an eruption heads away from Earth. What would you predict about radio trouble and auroras? Use the log to support your prediction.

3 YOUR TURN

Your own words

Write a three-sentence space-weather bulletin for a new report of 22 sunspots, no flare, and a prominence eruption aimed toward Earth. Predict one possible Earth effect, say when it might happen, and explain why your forecast is not certain using evidence from the log.

ANSWER KEY

Sun Signals

GRADE 6 · E.6.8.7

PART 1 · READ AND MARK

Underline Sun observations that could affect Earth, then circle the Earth effects in the passage and table. Number each underlined observation and its matching effect with the same number. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Days 2 and 3 both had strong flares. Which Earth effect was the same, which was different, and what Sun observation helps explain the difference?	**Radio faded soon on both days. Bright auroras followed day 2 but not day 3; day 2's eruption headed toward Earth, while day 3's headed away.**
2	Day 4 had more sunspots than day 2. Why would sunspot count alone have been a poor way to predict day 4's Earth report?	**Many sunspots can signal activity, but day 4 had no flare or eruption and no unusual radio trouble or auroras.**
3	On day 2, why did radio signals fade sooner than bright auroras appeared?	**A flare can disturb radio signals soon after it happens, while charged particles from an eruption may take a day or more to reach Earth.**
4	Suppose a new Sun report shows 16 sunspots but no flare, and an eruption heads away from Earth. What would you predict about radio trouble and auroras? Use the log to support your prediction.	**Unusual radio trouble and auroras are unlikely. Day 4 had many sunspots but no flare and no radio trouble, while day 3's eruption headed away from Earth and no unusual auroras were reported.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Bright auroras might appear near the poles a day or more after the eruption. The day 2 eruption headed toward Earth, and bright auroras appeared two days later. This forecast is not certain because the log shows only one Earthward eruption, and sunspot count alone cannot tell us what will happen.

Accept predictions that treat the log as evidence, not a guarantee. For the bulletin, students may also note that no immediate flare-related radio trouble is expected.